

The background of the slide is a photograph of a person standing in a natural rock arch, looking out at the Milky Way galaxy. The person is a small silhouette in the center of the arch. The galaxy is a bright, pinkish-purple band of stars and dust, stretching across the sky. The sky is dark purple and blue, with many stars visible. The rock arch is a dark silhouette. The overall scene is a night sky with a natural rock formation.

Welcome to *The Scale of Discovery*

*Educator
Workshops*

Presented by NASA's Discovery and New Frontiers Programs
April 26, 2014

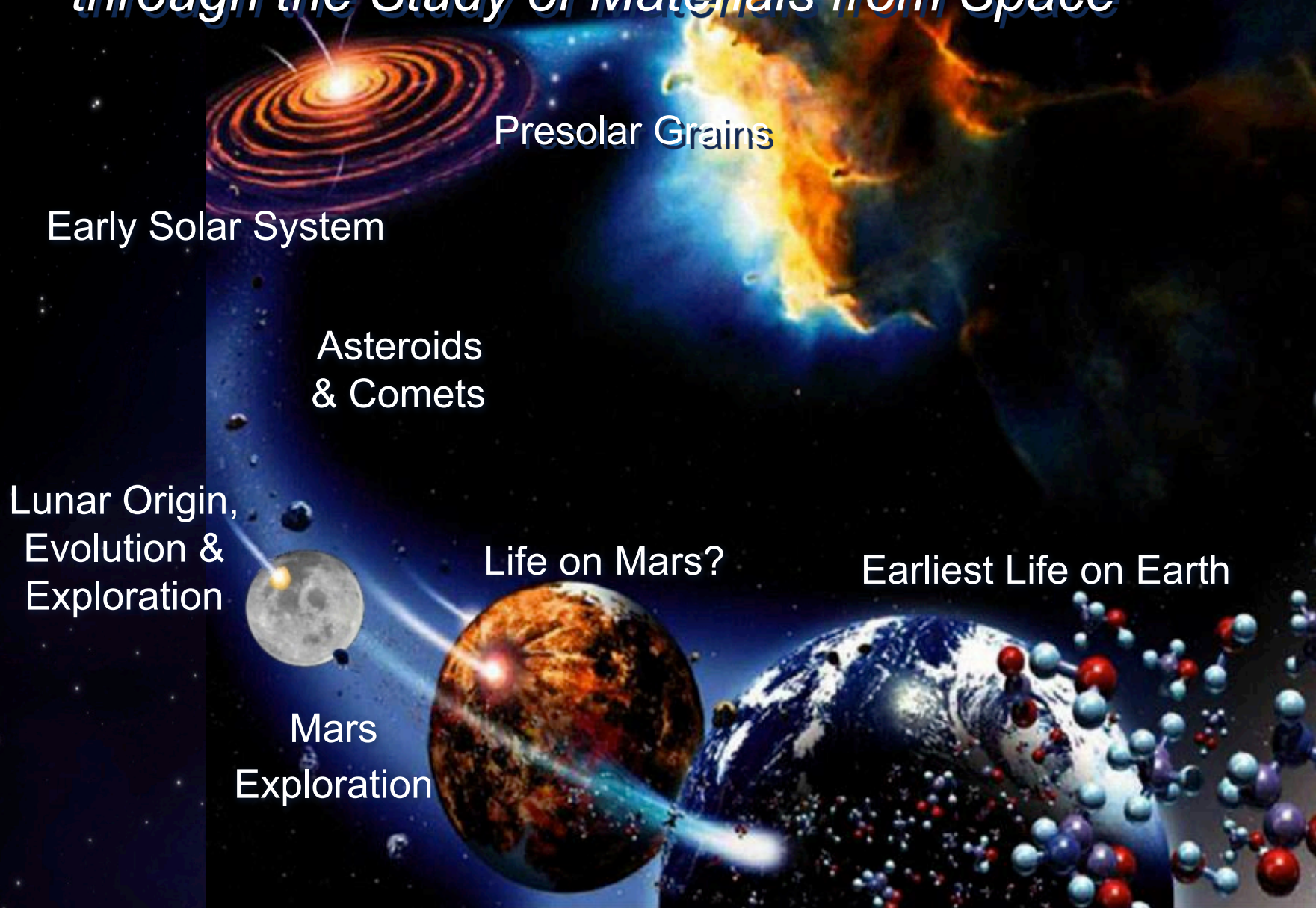
Cosmic Scale

TIME

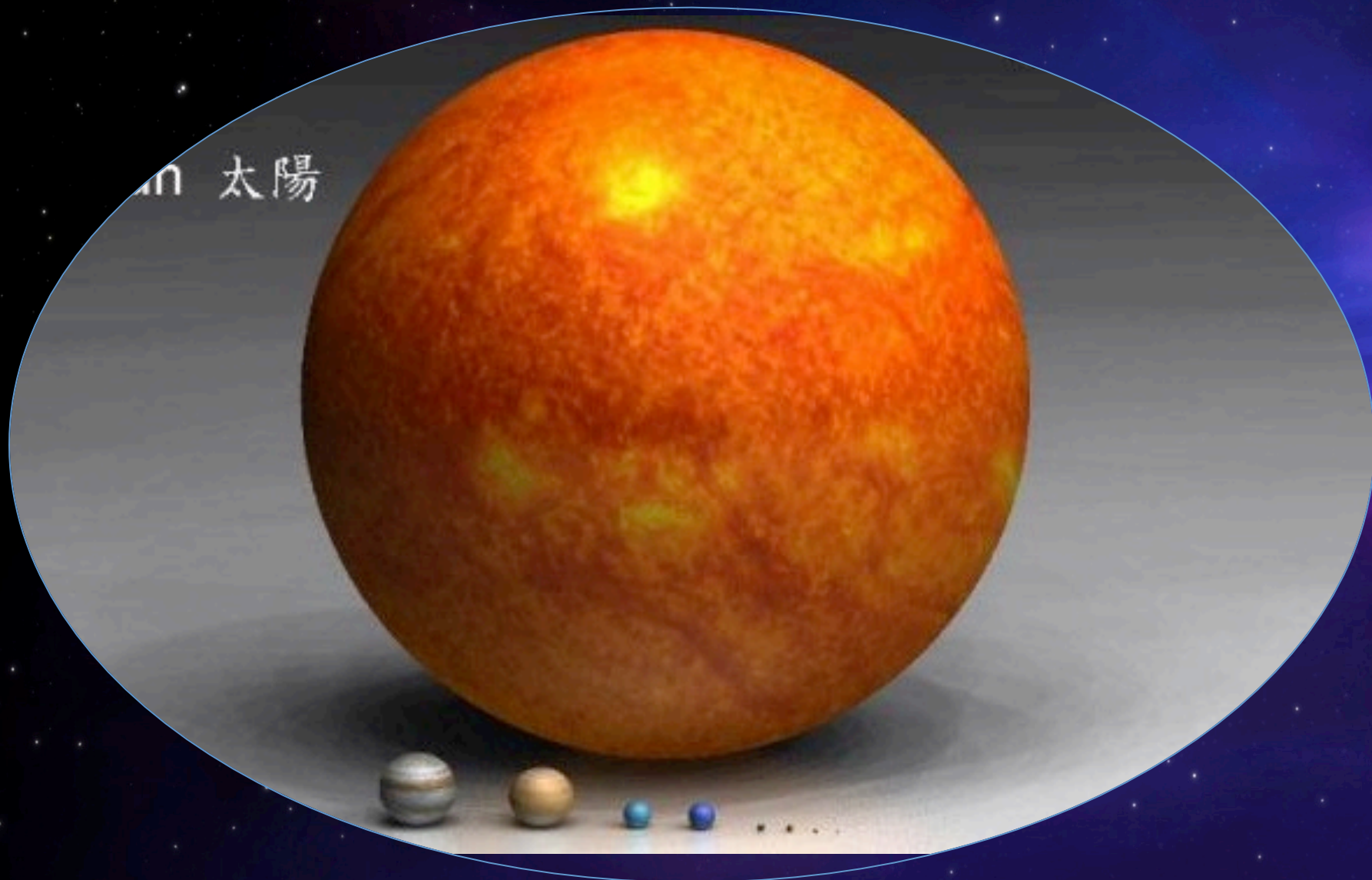
SIZE

DISTANCE

Going Back in Time to Understand our Solar System through the Study of Materials from Space



Size Matters



A composite image showing the Earth, Venus, Mars, Mercury, and the Moon in a row, illustrating their relative sizes. The Earth is the largest, followed by Venus, Mars, Mercury, and the Moon is the smallest. Each celestial body has a small black box with white text next to it, providing its name and diameter in kilometers. The Earth's diameter is 12,756 km. Venus's diameter is 12,104 km. Mars's diameter is 6,779 km. Mercury's diameter is 4,879 km. The Moon's diameter is 3,474 km.



Planet - Star Size Comparison

Distance

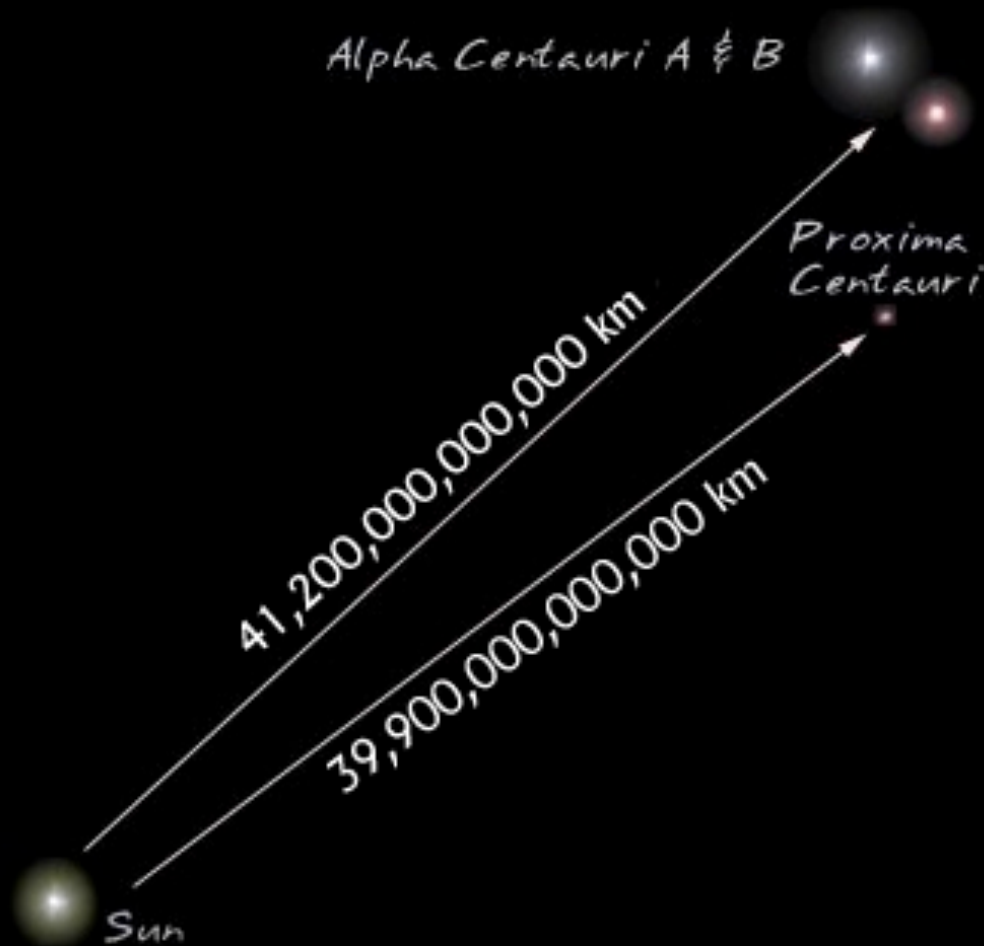


12,756 km

The Solar System



The Nearest Star System



The Solar Neighborhood



The Milky Way Galaxy



925,000,000,000,000,000 km

Human Scale



Ingenuity



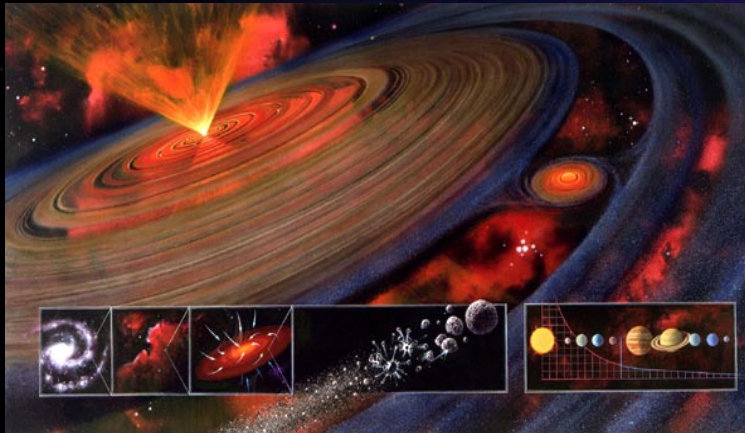
Perseverance



Imagination

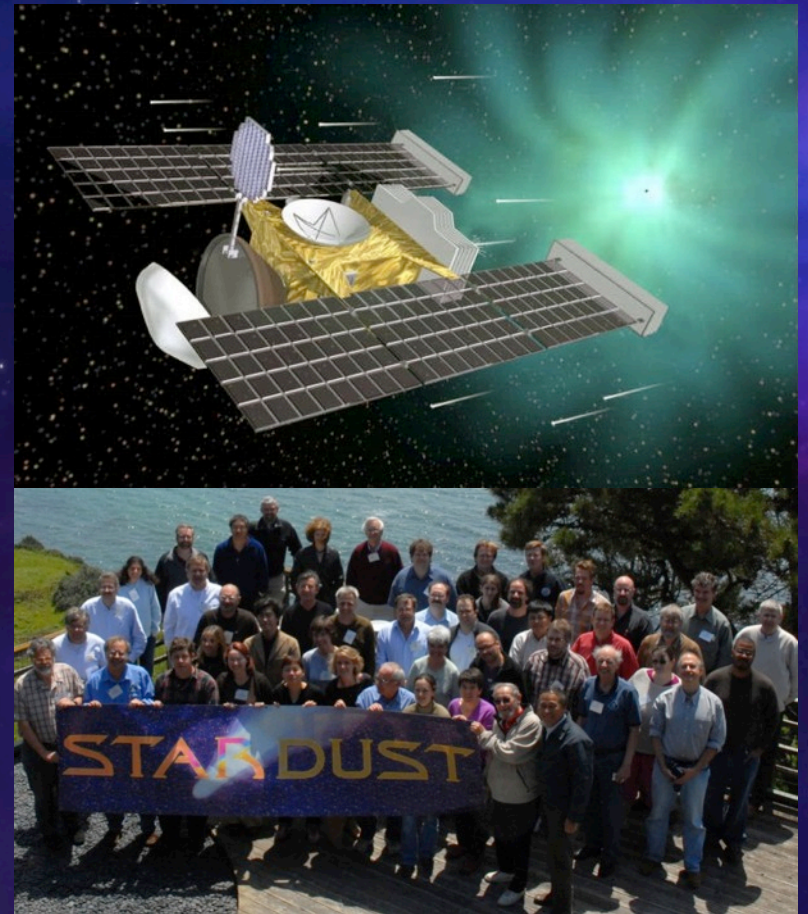
Planetary Science – Driven by Questions

Where do we come from?
Where are we going?
Are we alone?



NASA's Discovery and New Frontiers Programs

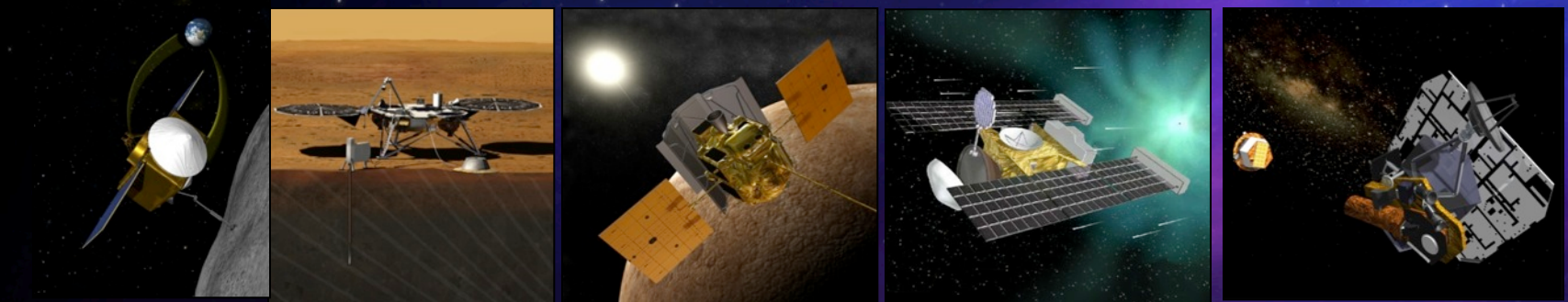
- Lower-cost planetary science missions search for answers to questions deemed most significant by the scientific community
- Proposed by a "Principal Investigator" who collaborates with a large team of scientists and engineers
- People with lots of questions, on a quest for new knowledge



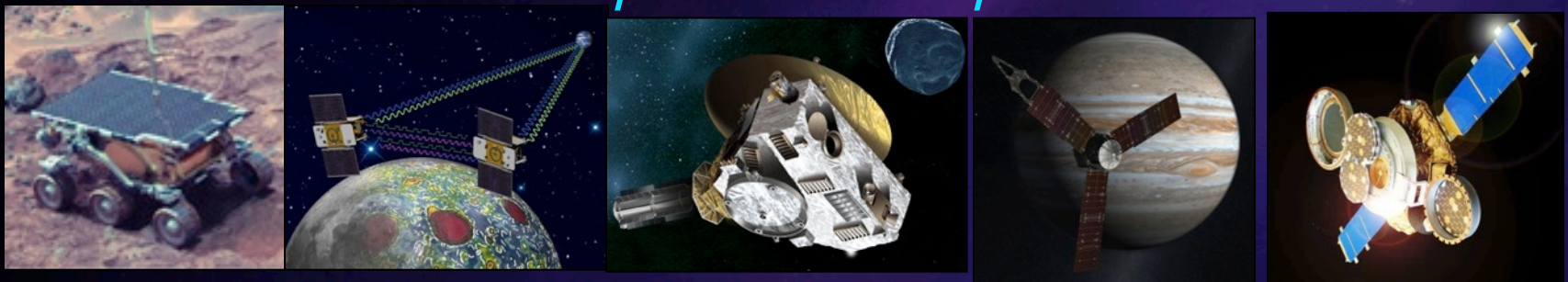
Exploring Planets, Moons, Asteroids & Comets



flybys • orbiters • landers

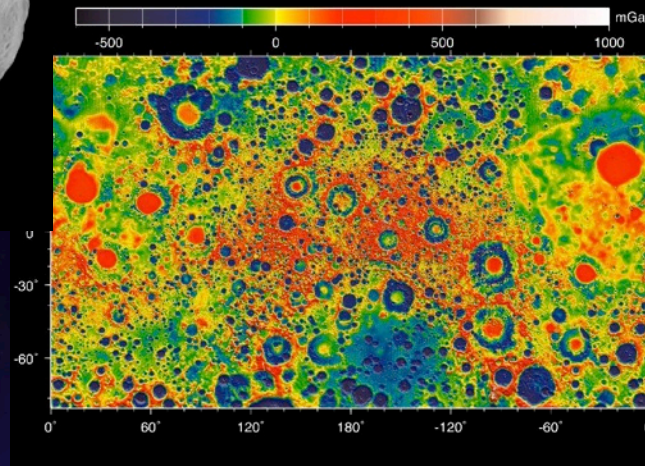
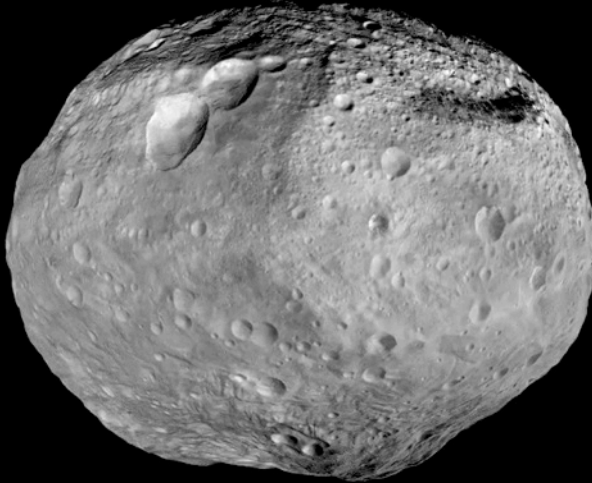


rovers • impactors • sample returns



Discovery and New Frontiers Missions

- Revolutionizing perceptions and challenging long-held theories with amazing new images, data and samples that result in ground-breaking new findings



Mercury's Secrets Revealed!

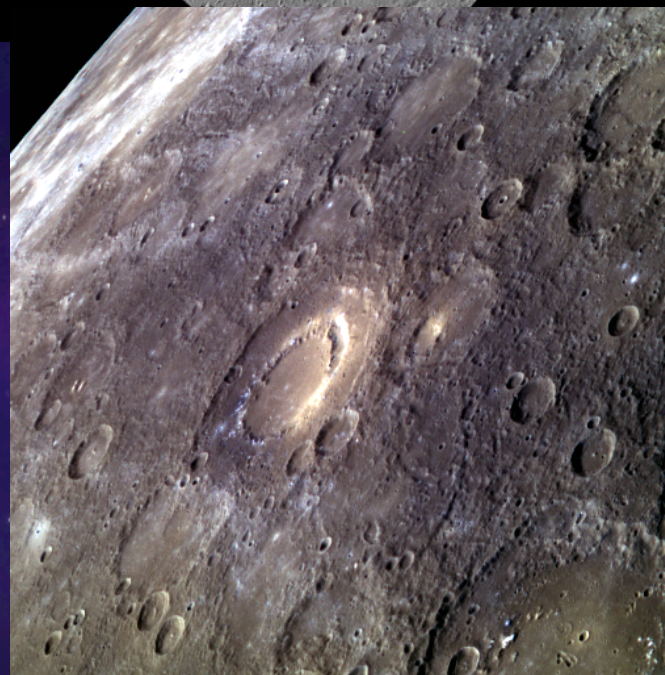
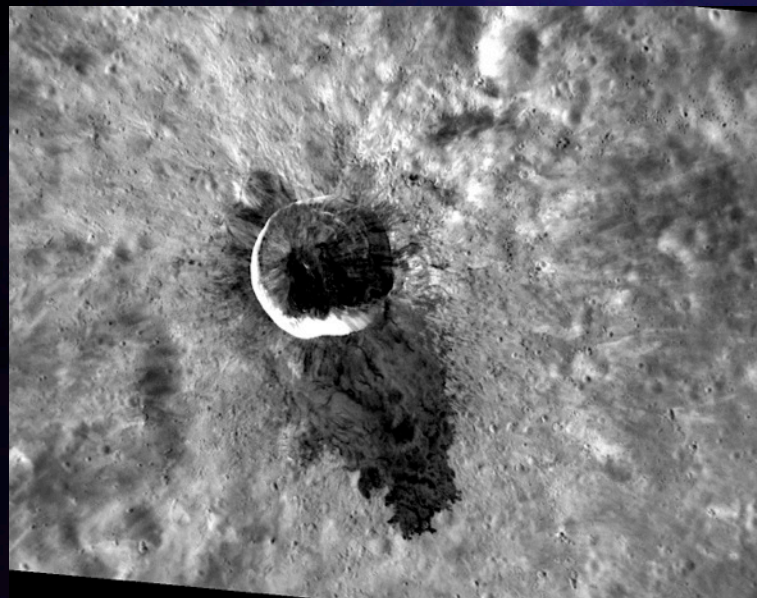
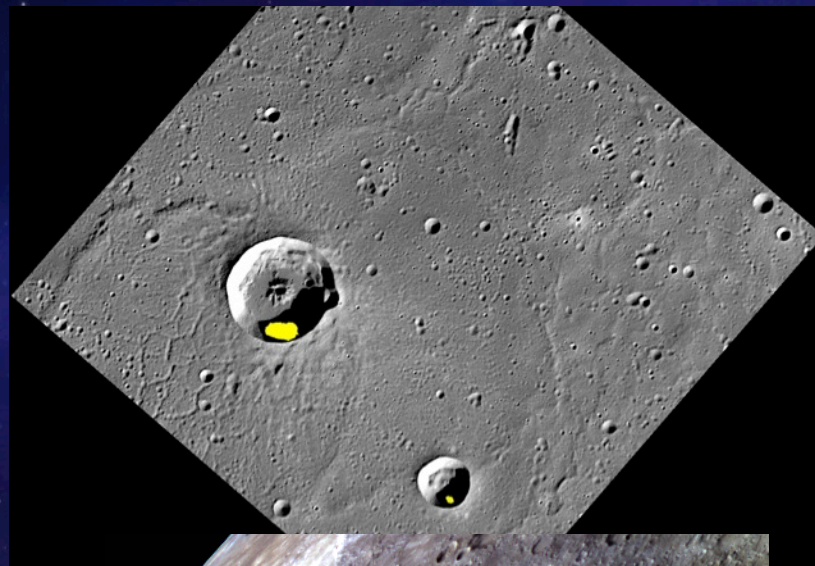
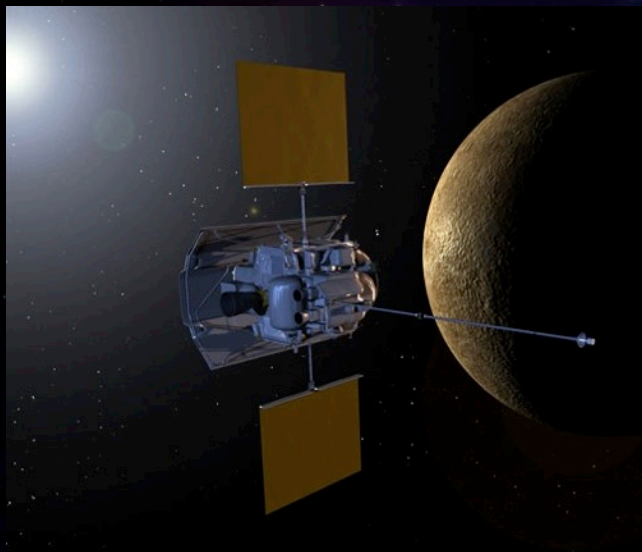
MESSENGER

- First Mercury orbiter
- Just completed orbit #3,000
- 124 miles above the surface



Sean Solomon
Principal Investigator

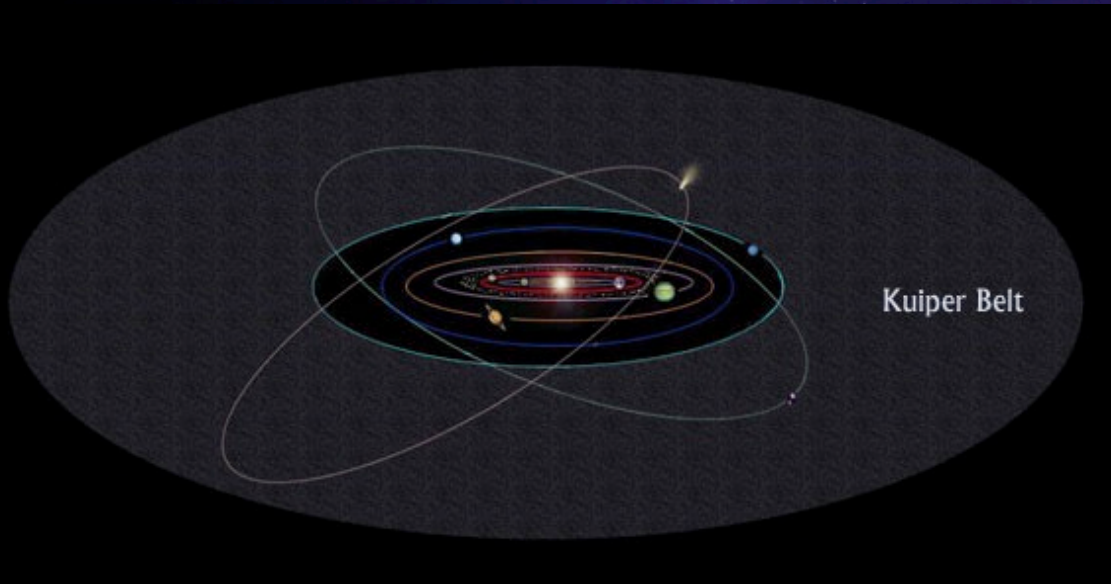
Mercury Up Close



Pluto – One Year from Encounter!

New Horizons

- First mission to study Pluto, its 5 moons and Kuiper Belt objects
- Reveal how ice dwarf planets formed and evolved over time
- Where these objects fit in with other solar system bodies



Alan Stern
Principal Investigator

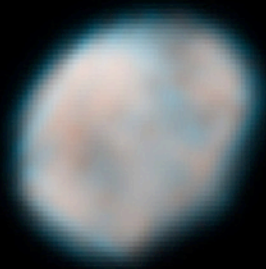
Comparing Massive Asteroids

Dawn

- Orbited Vesta for 12 months
- Less than one year from Ceres
- First close-up comparison of two very large and very different asteroid belt objects

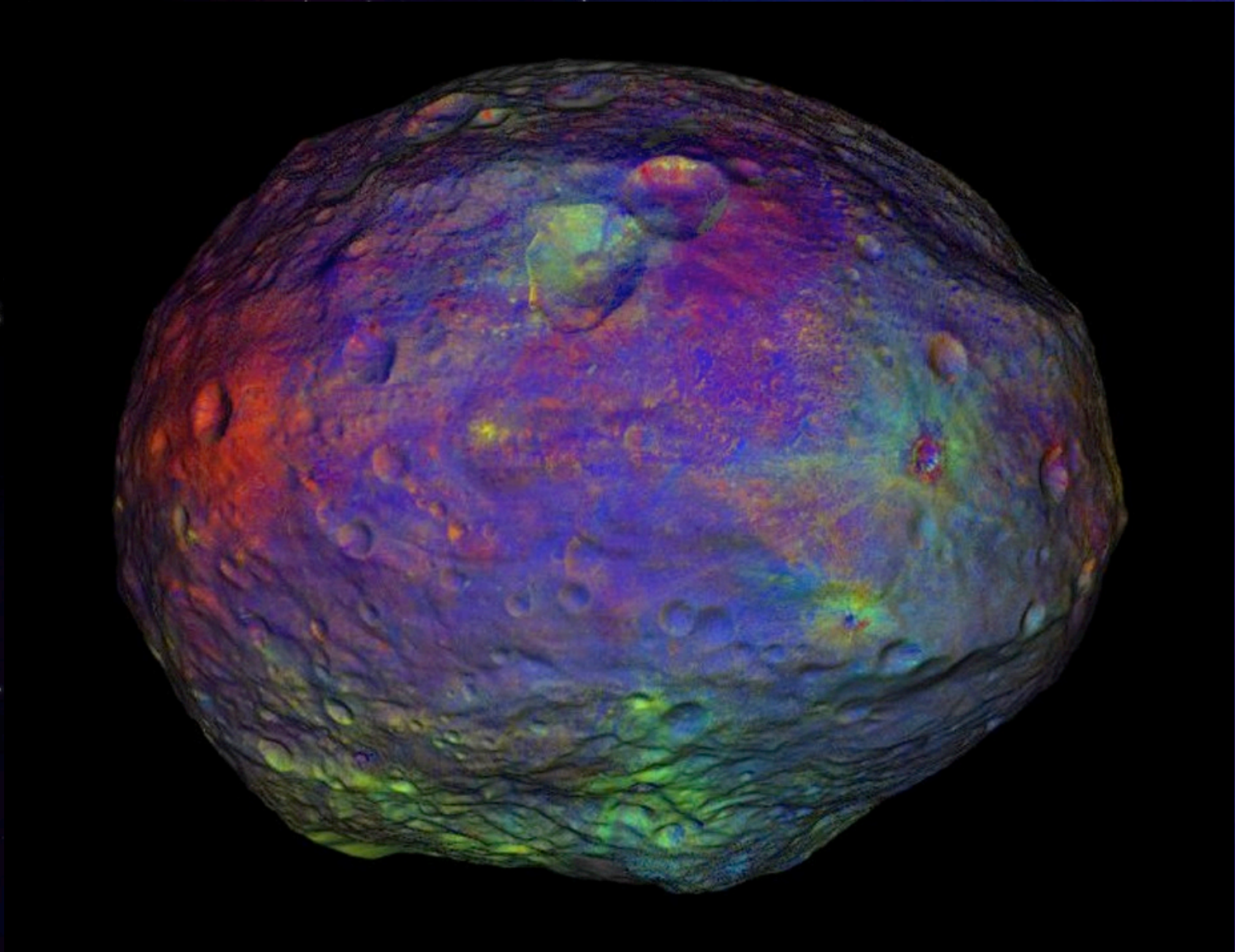


Hubble Space Telescope Best View of Vesta

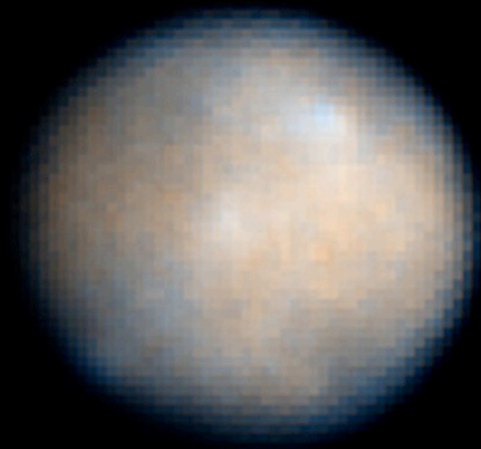


Vesta • May 14, 2007
HST WFPC2

Vesta from Dawn - 2012



Hubble Space Telescope Best View of Ceres

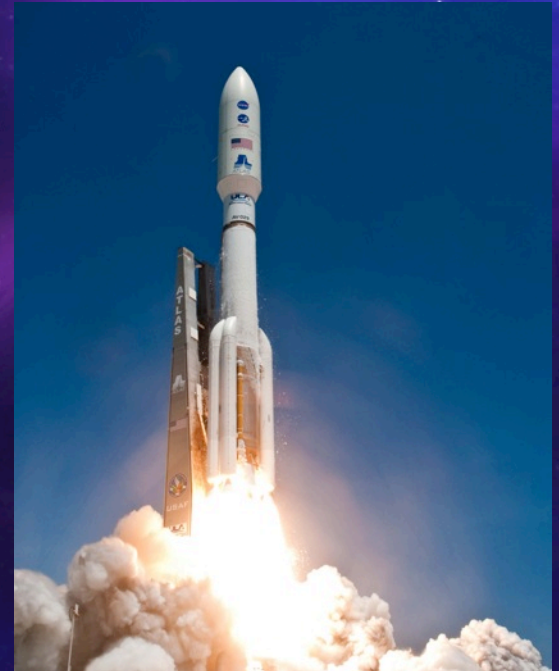
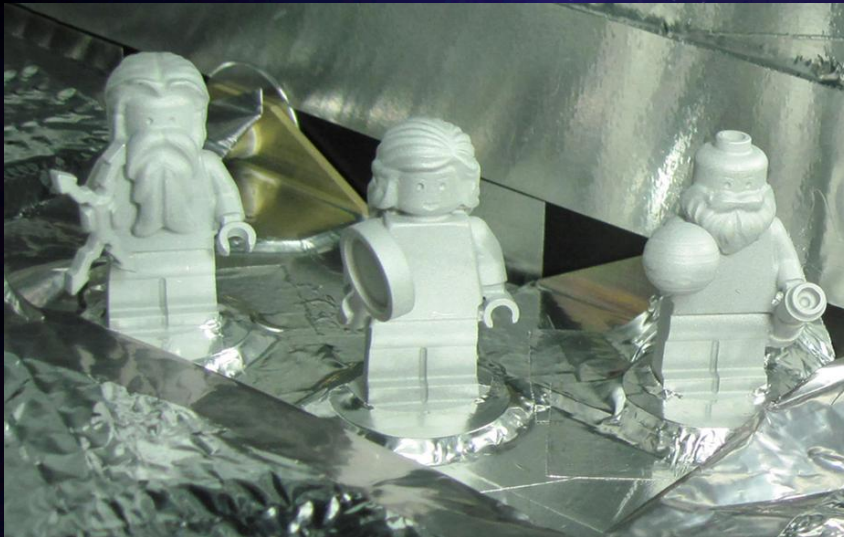
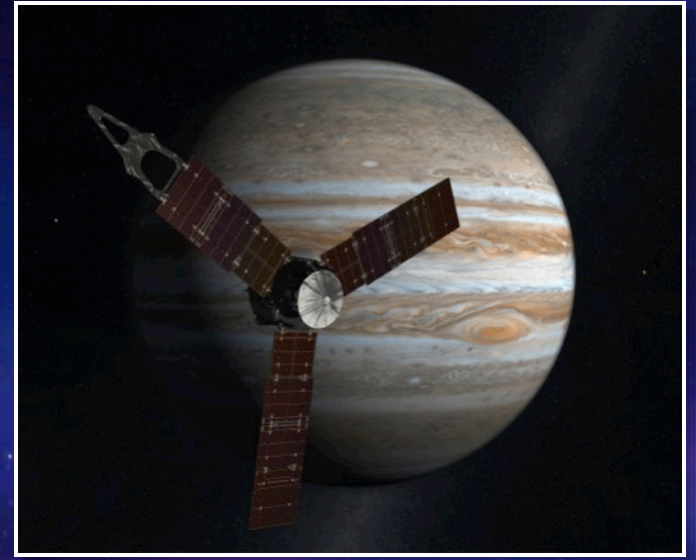


Ceres • January 24, 2004
HST ACS/HRC

Jupiter Orbiter

Juno

- How and where did Jupiter form?
- Juno will peer through the clouds to reveal hidden secrets from the formation and early evolution of the our solar system

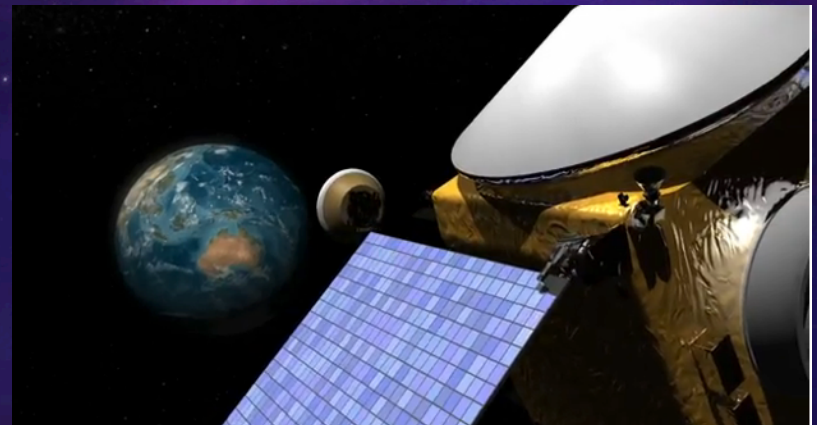
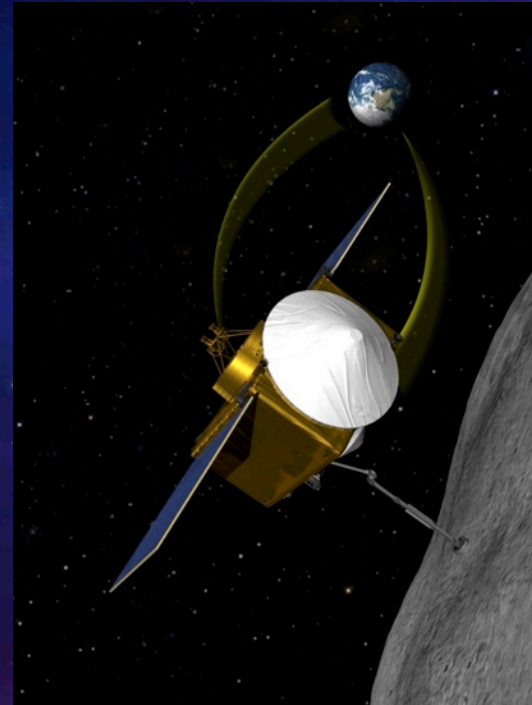


Returning Samples of Asteroid Dirt

OSIRIS-REx

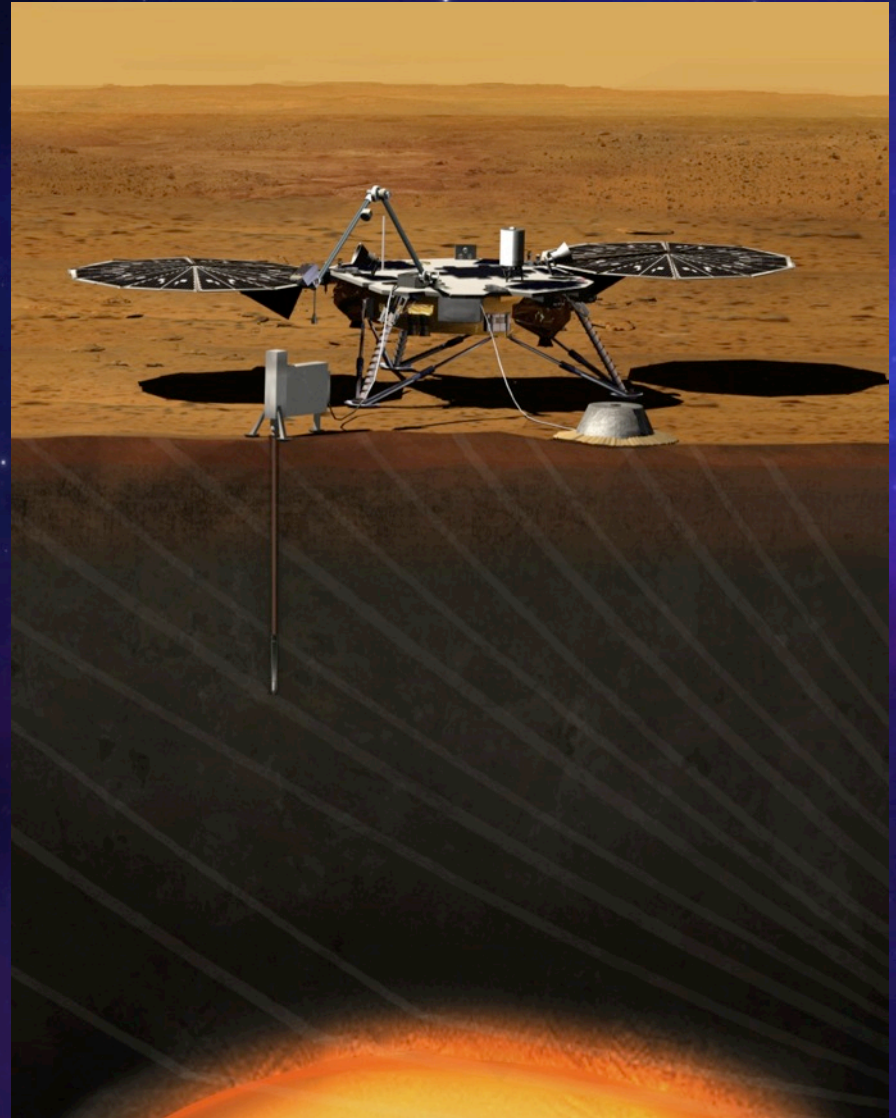
NASA's first asteroid sample return

- 2016 launch
- 2019 arrival at Bennu to map, measure, then grab a soil sample
- 2023 return to Earth after a journey of 823 million miles



InSight into Mars Quakes!

- Will place a geophysical lander on Mars to study its deep interior
- **InSight** into the processes that shaped the formation of the rocky planets of the inner solar system
- Launch March 2016
- Arrival at Mars 6 months later
- Two years of science operations



Opportunities to Participate

Each mission requires hundreds of people to
formulate the sciences questions | build the machines
design the flight path | develop the software
program the computers | create graphics and animations
operate the mission after launch



Learn More...

about all these missions that are visiting
New Worlds and making **New Discoveries**

discovery.nasa.gov
newfrontiers.nasa.gov

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NASA's exciting work!

